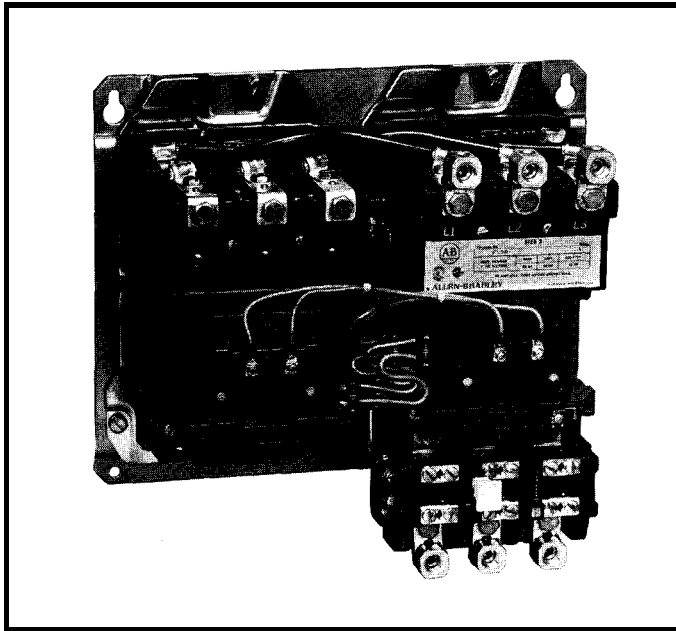




FULL VOLTAGE REVERSING STARTERS-SIZE 3



OPERATION- Bulletin 505 starters are most commonly used for full voltage starting and reversing of polyphase squirrel cage motors.

Bulletin 505 starters consist essentially of a "forward" and a "reverse" contactor mounted to a common base. These contactors are electrically and mechanically interlocked to guard against both contactors closing at the same time.

Starters are equipped with Bulletin 592 block type manual reset overload relays.

OPERATING ENVIRONMENT — Starters should always be maintained in a clean and dry condition for dependable operation. Choice of the proper NEMA enclosure type for the application is very important.

PREVENTIVE MAINTENANCE — For recommended preventive maintenance instructions refer to Publication GI-5.0 or the Handy Catalog.

REPAIRS — Starters can be disassembled as depicted in the "exploded" illustration on Page 6. Additionally the following procedures and techniques are suggested to aid in the sequential disassembly and reassembly of a motor starter.

WARNING — Before part replacements are attempted the POWER SOURCE MUST BE DISCONNECTED.

NOTE — If parts are removed from both contactors, keep them separate and replace them in their original positions, if reused, to avoid mismatched wear patterns.

DISASSEMBLY (Partial) -The following instructions apply to both the left hand and right hand contactors.

1. Remove all control wires from the operating coil (Item 7) and tie point terminal (Item 5). Tag removed wires.
2. Loosen two captive screws and lift off the contact block cover (Item 1).
3. Loosen four captive screws from the coil cover (Item 4). The tie point terminal is now free to be removed, if it is to be replaced.
4. With the coil cover screws loosened the auxiliary contact block(s) (Item 6) can be removed and the coil cover lifted off.
5. Lift out the movable contact support and armature assembly (Item 2), the yoke (Item 8) and the operating coil (Item 7) as a unit. The yoke and the operating coil can now be lifted up and out of the movable contact support assembly.

REPLACING CONTACTS-With steps 1-5 under DISASSEMBLY completed inspect the contact surfaces for evidence of wear. When severe contact wear is evidenced it is recommended that all contacts be replaced. Replacing all contacts will guard against uneven and unequal contact closings. Order the required number of single pole contact sets from the part listings on Page 6.

Movable Contacts —The following instructions describe the replacement of movable contacts.

1. Remove the movable contact (Item 9) by depressing the contact spring (Item 10) and pushing the contact out to either side. The contact spring will fall free or can be lifted out.
2. Hold the replacement spring and contact in one hand as shown in Figure 1.
3. Butt the contact spring against the side of the "seating projection" on the movable contact support assembly. Slip the movable contact through the opening on the movable contact support assembly. Rock the spring into position over the seating projection on the movable contact support and the movable contact.
4. Check to determine that the spring is holding the contact centered.

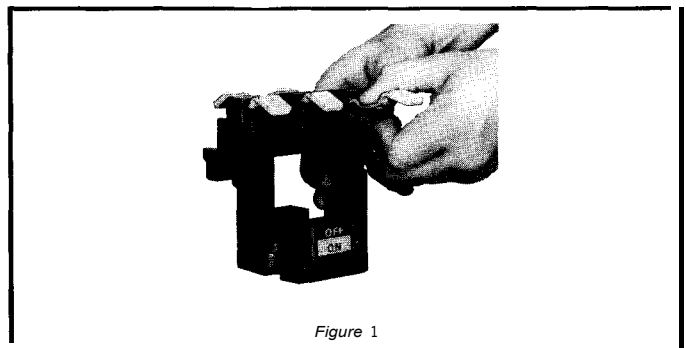


Figure 1

Stationary Contacts — The screws which secure the front and rear stationary terminals are accessible from the front. A socket wrench should be used to loosen and tighten contact securing screws. Note: Front and rear contacts should be removed and replaced in pairs one pole at a time.

1. Loosen the screw securing the front contact. Remove the contact and screw.
2. Loosen the screw securing the rear contact. Remove the contact and screw.
3. Install the new rear contact (refer to other poles for proper position). Tighten contact mounting screw securely (81-99 inch-pounds). Note: Front and rear contacts are different and keyed to fit in proper position.
4. Install the new front contact (refer to other poles for proper position). Tighten contact mounting screw securely (81-99 inch-pounds).
5. Repeat Steps 1 through 4 for the remaining poles.

REPLACING THE STATIONARY CONTACT BLOCK AND BASE ASSEMBLY

— All power and external control wiring to the Bulletin 505 must be disconnected and the entire assembly must be removed from the enclosure or panel to replace either stationary contact block and base assembly. Tag removed wires.

1. Remove the interconnecting power wiring from the contactor requiring servicing and overload control wiring if the right hand stationary contact block and base assembly is to be replaced. Completely remove interconnecting power strap. Tag removed wires.

2. Follow steps 1 through 5 under DISASSEMBLY

3. The right hand contactor block and base assembly is connected, by bus, to the overload relay. Remove the three 1/4-20 x 5/16" contactor mounting screws (Item 16), then remove the contactor from the Bulletin 505 mounting plate (Item 21). Turn the contactor over so the back of its mounting plate (Item 20) faces up, then remove the two #10-32 x 3/8" screws with washers. Turn the starter over so the contactor faces up, then remove the three 5/16-24 x 1/2" overload relay terminal screws. The overload relay including mounting plate assembly will now come free of the contactor. (Step 3 is not necessary for the left hand contactor.)

4. The block and base assembly is secured to the mounting plate (Item 20) by three 1/4-28 x 1-1/8" mounting screws with washers (Item 15). The stationary contact block and base assembly (Item 3) can be lifted out when the screws are removed.

5. If new contacts are not being installed, remove stationary contacts one at a time from the old block and base assembly and install them in the same positions in the new assembly. (See instructions under REPLACING CONTACTS. Follow those instructions also if installing new contact sets.)

6. Install the replacement block and base assembly onto the contactor mounting plate (Item 20) and secure with the three screws with washers (Item 15) and tighten securely (40-60 inch-pounds).

7. If the right hand contactor was removed, refasten the overload mounting plate to the contactor mounting plate (Item 20) with the two #10-32 x 3/8" screws with washers (tighten to 24-36 inch-pounds torque). Note: The overload

mounting plate fits between the contactor mounting plate and the block and base assembly. Reinstall the three 5/16-24 x 1/2" overload relay terminal screws (tighten to 126-154 inch-pounds).

IMPORTANT — When the stationary contact block and base assembly is positioned next to the mechanical interlock, be sure the "projection" on the mechanical interlock is inserted into the slot in the base of the contactor. See Figure 3.

8. Install the right hand contactor (if removed) onto the Bulletin 505 mounting plate (Item 21) with the three 1/4-20 x 5/16" screws (tighten to 52-78 inch-pounds).

9. Reassemble contactor per REASSEMBLY instructions.

10. Determine if the mechanical interlock is a fixed or adjustable type: The fixed type is mounted directly to the mounting plate (Item 21) and has no locating bracket subassembly. The adjustable type has a locating bracket subassembly and is shown in Figure 3.

11. If the mechanical interlock is an adjustable type, adjust per MECHANICAL INTERLOCK ADJUSTMENT procedure on Page 4.

12. Reconnect interconnecting power wiring and strap. Torque screws to 81-99 inch-pounds.

13. Reinstall the complete Bulletin 505 assembly in the enclosure and reconnect the external control, line and load wiring.

REPLACING THE OVERLOAD RELAY — The overload relay (Item 13) is connected to both the block and base assembly (Item 3) and load lines.

1. Remove the control wire(s) from the overload relay.

2. Remove the load wiring from the overload relay lugs.

3. Loosen and remove the three 5/16-24 x 1/2" terminal screws that connect the overload relay bus to the block and base assembly.

4. The overload relay is secured to its mounting plate by two 1/4-20 x 9/16" mounting screws with washers. Remove these two mounting screws. Lift the overload relay out.

5. Install the replacement overload relay to its mounting plate being sure the relay properly engages the mounting plate.

6. Secure the overload relay to the bus with the three previously removed terminal screws. Tighten securely (126-154 inch-pounds).

7. Replace the two 1/4-20 x 9/16" mounting screws to the overload relay mounting (tighten to 32-48 inch-pounds).

8. Reconnect control and load wiring.

OVERLOAD RELAY TEST MODULE — The overload relay is equipped with a test module (Item 14) on the right side. It allows opening the normally closed overload contact for test purposes without tripping the relay.

1. To remove, insert an appropriate size screwdriver in slot provided on the overload relay. Push toward mounting plate and simultaneously pull module from relay. Refer to Figure 7 on Page 5.

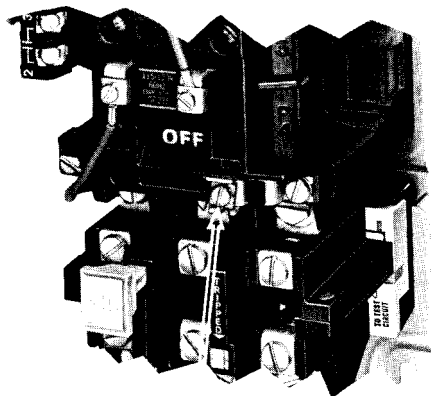
2. To install, squeeze the front of the replacement test module and simultaneously snap the module into place on the relay.

REASSEMBLY — The reassembly process is basically the disassembly procedure in reverse order.

1. Place the movable contact support and armature assembly (Item 2) in the contactor base.

IMPORTANT — Be sure the movable contact support is below the cam on the mechanical interlock.

2. Install the contact block cover and tighten screws securely (25-30 inch-pounds).
3. Insert the yoke (Item 8) into the operating coil (Item 7). Place the yoke-coil assembly into the contactor base. The parts are keyed to fit only one way.
4. Replace the coil cover (Item 4). If used, check the tie point terminal for proper position. Tighten the coil cover screws securely (25-30 inch-pounds).
5. With the movable contact support and armature assembly in the "OFF" position, install the auxiliary contact block(s) (Item 6), using instructions on Page 4.
6. Reconnect control wires to the operating coil and tie point terminal



Proper Tie Point Terminal Position

Figure 2

REPLACING MECHANICAL INTERLOCK — All power and external control wiring to the Bulletin 505 must be disconnected and the entire assembly must be removed from the enclosure or panel to replace the mechanical interlock. Tag removed wires.

1. Loosen and remove from the right hand contactor all interconnecting power wires leaving these wires connected to the left hand contactor. Completely remove the interconnecting power strap.
2. Loosen and remove from the right hand contactor all interconnecting control wires by removing them from terminals and by removing the auxiliary contact blocks. (See Page 4 for auxiliary contact block removal.)
3. Each contactor mounting plate (Item 20) is secured to the Bulletin 505 mounting plate (Item 21) with three 1/4-20 x 5/16" screws (item 16). Remove these screws from the right hand contactor and slide it off the mounting plate.
4. Determine if the old mechanical interlock is a fixed or adjustable type: The fixed type is mounted directly to the mounting plate (Item 21) and has no locating bracket subassembly. The adjustable type has a locating bracket subassembly and is shown in Figure 3.

5. If the mechanical interlock is an adjustable type, no mounting plate modifications will be necessary and steps 6, 7, 8 and 9 are omitted. Remove and discard the entire old interlock assembly and proceed to step 10.
6. If the mechanical interlock is a fixed type, remove and discard it, and mark the two #10-32 mounting screw holes for future reference.
7. Remove the left hand contactor in the same manner as step 3.
8. Modify the Bulletin 505 mounting plate per MOUNTING PLATE MODIFICATIONS FOR ADJUSTABLE MECHANICAL INTERLOCK supplied with the new mechanical interlock.
9. Install the left hand contactor onto the Bulletin 505 mounting plate with the 1.4-20 x 5.16" screws. (Torque to 52-78 inch-pounds).
10. With the movable contact support of the left hand contactor in the full OFF position, install the new adjustable mechanical interlock and locating bracket subassembly on the Bulletin 505 mounting plate using the #10-32 x 15/64" Tensil-Lock mounting screws. Securely tighten the lower locating bracket screw only (24-29 inch-pounds). The upper and middle mounting screws should be left hand tight to allow for later adjustment. Refer to Figure 4.

IMPORTANT—Be sure the "projection" on each side of the mechanical interlock is inserted into the slot in the stationary contact blocks of the contactors and that each cam is above the movable contact support which is in the full OFF position. (See Figure 3).

11. Install the right hand contactor onto the Bulletin 505 mounting plate with the 1/4-20 x 5/16" screws. See IMPORTANT note above. (Torque screws to 52-78 inch-pounds).
12. Adjust mechanical interlock per MECHANICAL INTERLOCK ADJUSTMENT procedure on Page 4.
13. Reconnect the interconnecting power wires and strap. Tighten screws securely (81-99 inch-pounds). Verify proper connections per wiring diagram supplied with starter.
14. Replace all interconnecting control wires and auxiliary contact blocks that were removed in step 2. (See Page 4 for auxiliary contact block installation.) Verify proper connections per wiring diagram supplied with starter.
15. Reinstall the complete Bulletin 505 assembly in the enclosure and reconnect the external control, line and load wiring

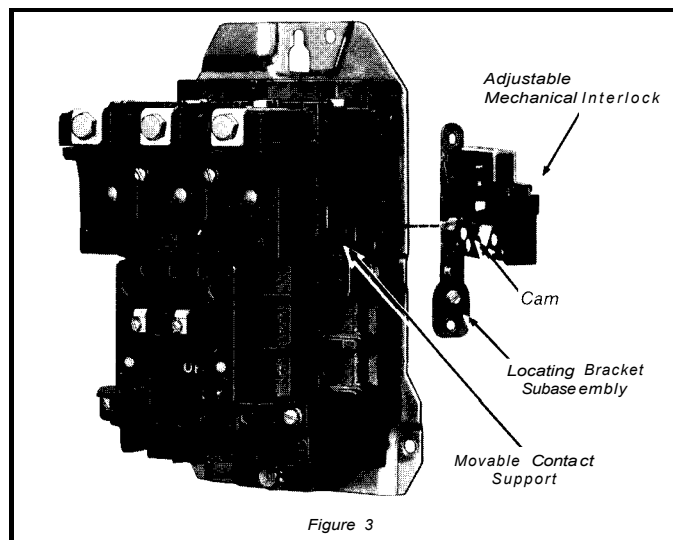
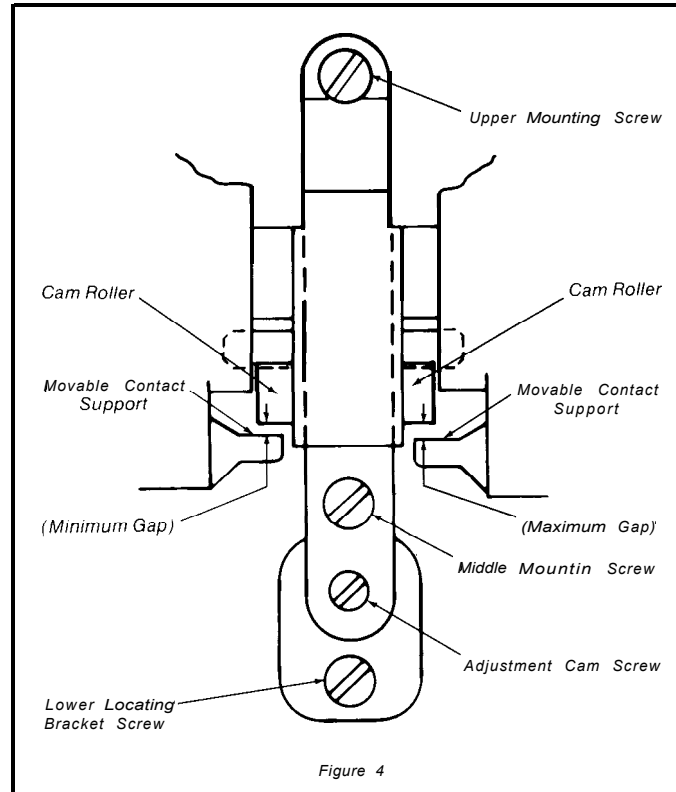


Figure 3

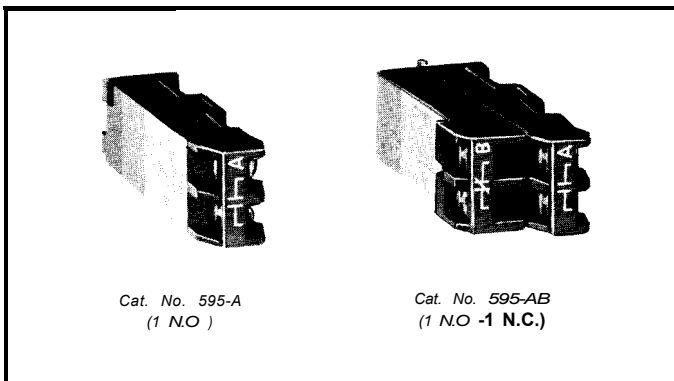
MECHANICAL INTERLOCK ADJUSTMENT —

1. Check the lower locating bracket screw, as shown in Figure 4—should be tightened to 24-29 inch-pounds.
2. Check the upper and middle mechanical interlock mounting screws, as shown in Figure 4—should be hand tight.
3. Adjust the mechanical interlock using the adjustment cam screw to a maximum gap between the mechanical interlock cam rollers and the movable contact supports. (Refer to Figure 4.)
4. Position the device in the normal operating position (vertical).
5. Observe the gaps between the movable contact supports and the mechanical interlock cam rollers and note which side has the minimum gap. (Refer to Figure 4.) **Note:** The minimum gap can be either on the right or the left hand side of the mechanical interlock.
6. Adjust the mechanical interlock using the adjustment cam screw to reduce the “minimum” gap to zero between the cam roller and the highest movable contact support. **Note:** Only one cam roller will be in contact with a movable contact support.
7. Tighten the upper and middle mechanical interlock mounting screws to 24-29 inch-pounds.
8. Push one movable contact support to the sealed position and try to lift the other movable contact support. This movable contact support must be free to move slightly, but not to the sealed position.
9. Repeat step 8 on the opposite movable contact support.
10. If both movable contact supports have the proper movement as required in steps 8 and 9 the adjustment is complete. If in either steps 8 or 9 the unsealed movable contact support has no movement in the open position, the

contactors are not properly aligned on the mounting plate. Loosen the contactor mounting screws and shift the position of each contactor on the Bulletin 505 mounting plate to properly align the contactors, then retorque the mounting screws to 52-78 inch-pounds. Repeat steps 2 through 10.



AUXILIARY CONTACTS



AUXILIARY CONTACTS — Bulletin 505 starters are designed to accept one to four auxiliary contact blocks which can provide up to eight auxiliary contacts of the user's choice. Auxiliary contact blocks mount at positions P1 and P2 on the coil cover of the left hand contactor, and P3 and P4 on the coil cover of the right hand contactor. Normally, the inboard mounting positions on both contactors are used for or obstructed by factory installed interlock contact blocks. Auxiliary contact blocks can be mounted without the use of tools or additional hardware.

REMOVAL OF AUXILIARY CONTACT BLOCK — Loosen coil cover and lift out the auxiliary contact block by pivoting its back end away from starter.

Auxiliary Contact Description	Catalog No.
Electrical Interlock (Located at "P1")	Part No. 40495-455-04
Electrical Interlock (Located at "P4")	Part No. 40495-455-05
One Normally Open (1 N.O.)	595-A
One Normally Closed (1 N.C.)	595-B
One Normally Open-One Normally Closed (1 N.O.-1 N.C.)	595-AB
Two Normally Open (2 N.O.)	595-AA
Two Normally Closed (2 N.C.)	595-BB
One Normally Closed Late Break	595-BL

INSTALLING OR REPLACING AN AUXILIARY CONTACT BLOCK

The movable contact support and armature assembly must be completely open (the word "OFF" totally visible). The coil cover must be in place and properly secured (25-30 inch-pounds).

1. Align narrow molded end on auxiliary contact block. See Figure 5 on Page 5.
2. Locate molded tabs on side with arrows. See Figure 5 on Page 5.
3. Hook tabs under coil cover at any pocket location (P1, P2, P3 or P4).
4. Exert a pivotal force at the lower end of the block until it snaps into place. (Refer to Figure 6 on Page 5.)

NOTE—Parts indicated with are recommended spare parts.

TO ADD N.O. AUXILIARY CONTACT CATALOG NUMBER 595-A34 IN PLACE OF CIRCUIT TEST MODULE ON OVERLOAD RELAY —

1. Insert proper size screwdriver in slot at the top of Circuit Test Module, press towards mounting plate and pull module from relay. (Refer to Figure 7).
2. Loosen two screws holding sections of auxiliary contact together. (Refer to Figure 8).
3. Place the section containing the stationary contacts above the retaining ribs on the overload relay and the section containing the movable contacts below the same retaining ribs. (Refer to Figure 9.)
4. Securely tighten two screws to fasten the two sections of the auxiliary contact together and to the overload relay housing retaining ribs. (Refer to Figure 10.)
5. Wire N.O. auxiliary contact as required.

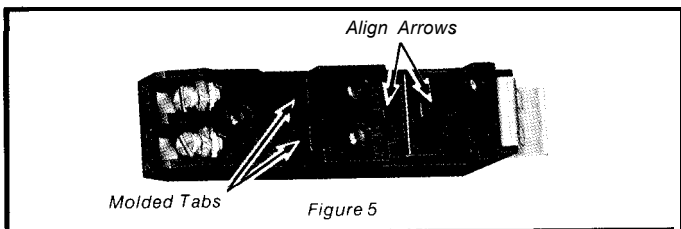


Figure 5

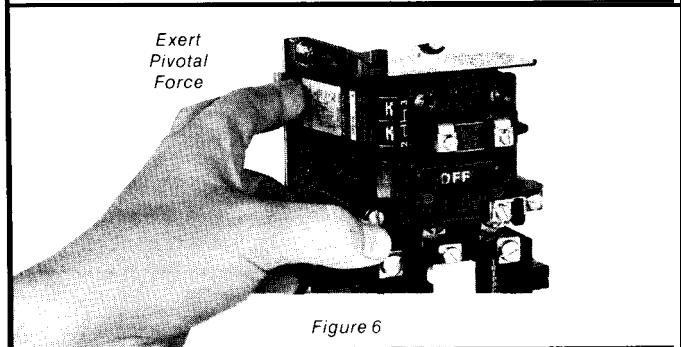


Figure 6

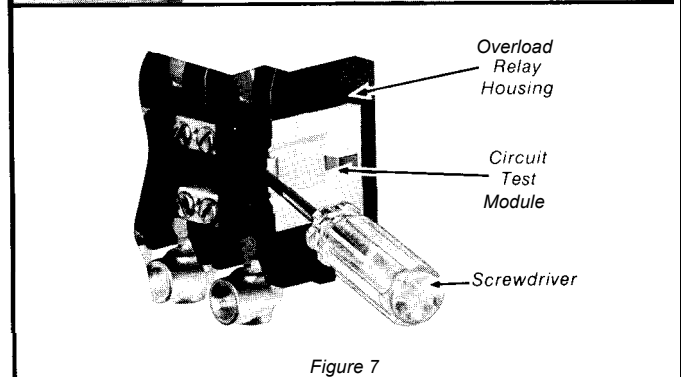


Figure 7

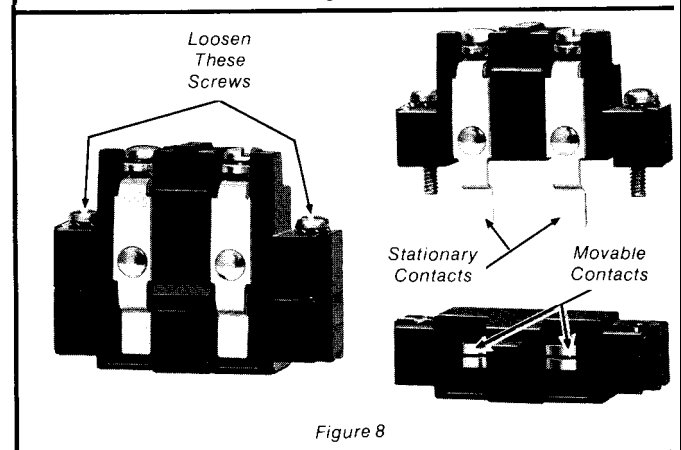


Figure 8

TO REPLACE N.O. OR N.C. AUXILIARY CONTACT CATALOG NUMBER 595-A34 ON OVERLOAD RELAY -The function of the auxiliary is N.O. when mounted on the end of the relay furthest from the reset button and N.C. when mounted on the end nearest the reset button. Note: N.O. and N.C. are stamped on the relay housing to indicate function.

1. Remove control wiring from terminals of auxiliary contact being replaced.
2. Remove the auxiliary contact by loosening the two screws which clamp it to the overload relay, sliding the two sections of the contact apart (approximately 1/8") and removing them from the relay. (Refer to Figure 11.)
3. Install new contact following instructions given above for adding auxiliary contact.
4. Replace control wires removed in Step 1 to terminals of new auxiliary contact.

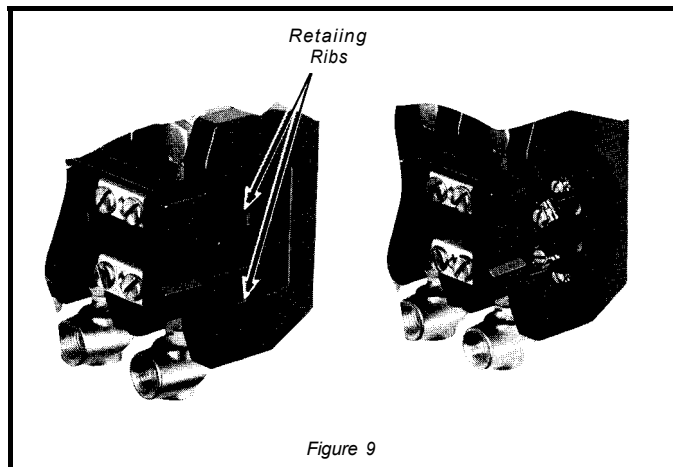


Figure 9

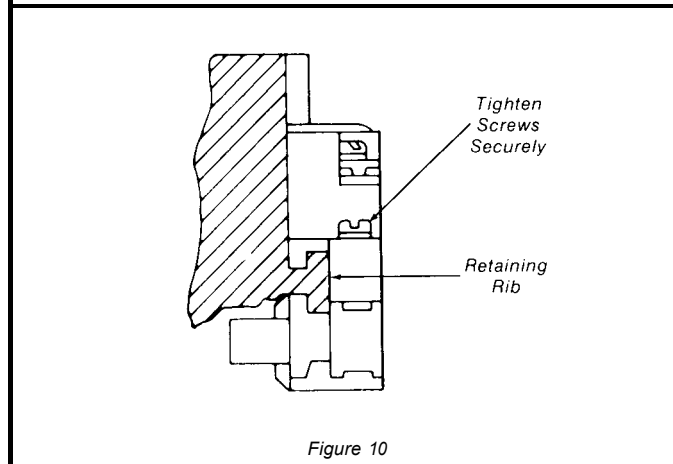


Figure 10

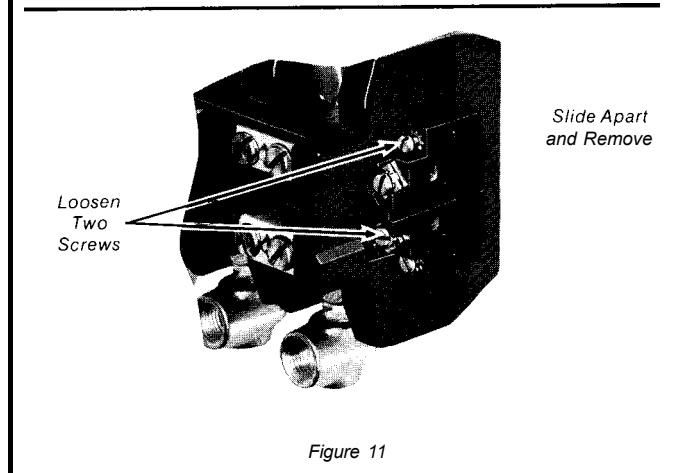
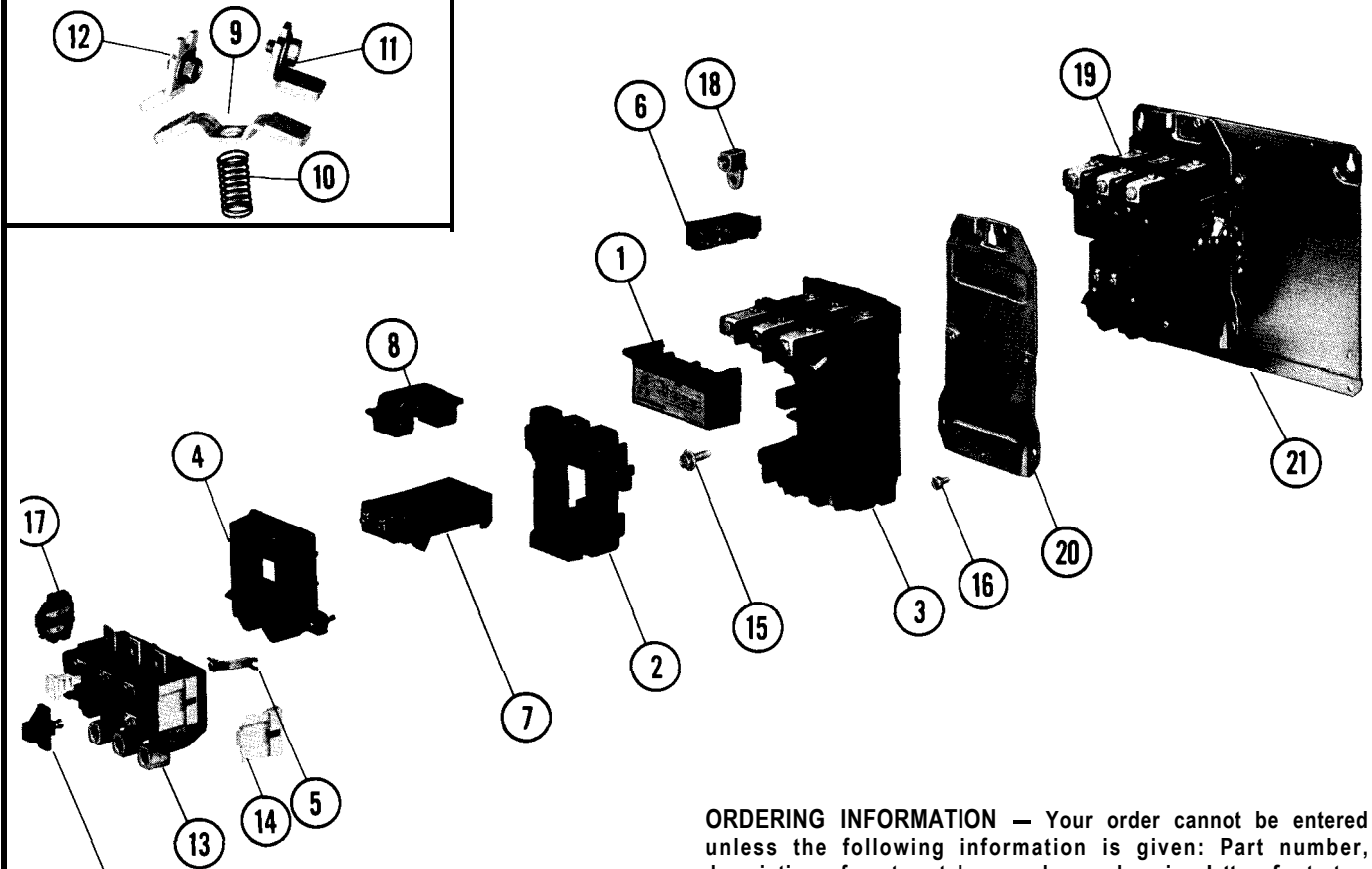


Figure 11

CONTACTS



★ Heater Element
Type W (Specify)

ORDERING INFORMATION — Your order cannot be entered unless the following information is given: Part number, description of part, catalog number and series letter of starter. This renewal parts list applies also to these starters when used on control apparatus listed under other bulletin numbers.

Item	Description of Part	Part No.
1	Contact Block Cover	40430-457-51
2	Movable Contact Support with Armature Assembly <input checked="" type="checkbox"/>	40430-452-51
3	Right Hand Stationary Contact Block and Base Assembly <input checked="" type="checkbox"/>	40430-462-52
	Left Hand Stationary Contact Block and Base Assembly <input type="checkbox"/>	40430-462-54
4	Coil Cover	40430-454-51
5	Tie Point Terminal	599-TP34
6	Auxiliary Contact Block <input checked="" type="checkbox"/>	See Table Pg. 4
7	Operating Coil	See Table
8	Yoke (60-50 Hz.)	40430-455-51
9	Movable Contact	Order Single Pole Contact Set
10	Contact Spring	
11	Front Stationary Contact	
12	Rear Stationary Contact	
9-12	Single Pole Contact Set (includes [1] each items 9-12)	40430-300-51 ★
13	Overload Relay (includes item 14 and 17)	592-D0W16 ★
14	Test Module (included with item 13 overload relay)	40430-459-51
15	1/4-28 x 1-1/8" Screw W/Square Cone Washer (3 Req'd)	40430-460-51
16	1/4-20 x 5/16" Screw W/Lockwasher (3 Req'd)	Not Available
17	Auxiliary Contact (Included with Item 13)	595-A34 ★
18	Lug	40430-461-51
19	Mechanical Interlock	40410-341-51
20-21	Mounting Plates	Refer to Factory

Operating Coils <input checked="" type="checkbox"/> ★		
Coil AC Voltage Range	Frequency Hz	Coil No.
24	60	CD013
115-120	60	CD236
110	50	
110-115	50	CD322
200-208	60	CD249
220-230	50	CD339
	60	CD254
230-240	50	CD342
	60	CD354
380	50	CD357
415	50	CD360
440-460	50	CD273
460-480	60	CD273
500	50	CD364
575-600	60	CD278

Less contacts, order single Pole Sets as required.

Starters are furnished with one electrical interlock auxiliary contact block on each contactor as standard. These electrical interlock auxiliary contact blocks are different than the optional auxiliary contact blocks and from each other.

For coils others than those listed specify coil number and complete rating found on coil's identification label.

NOTE-Parts indicated with ★ are recommended spare parts.